

5 What is claimed is:

1. A lead electrode assembly for subcutaneous  
implantation comprising:

an electrode;

at least two channel guides coupled to the electrode

10 for positioning the lead electrode assembly.

2. The lead electrode assembly of claim 1, wherein the  
electrode is substantially planar.

15 3. The lead electrode assembly of claim 2, wherein the at  
least two channel guides comprise a first channel guide and a  
second channel guide and wherein the first channel guide is  
coupled to a first side of the electrode and the second channel  
guide is coupled to a second side of the electrode.

20 4. The lead electrode assembly of claim 3, wherein the  
first channel guide and the second channel guide each comprise a  
strip of material.

25 5. The lead electrode assembly of claim 4, wherein the  
strip of material comprises a polymeric material..

5           6.    The lead electrode assembly of claim 5, wherein the  
polymeric material is selected from the group consisting  
essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
10 thereof.

7.    The lead electrode assembly of claim 4, wherein the  
strip of material is coupled to the electrode with stitching.

15           8.    The lead electrode assembly of claim 4, wherein the  
strip of material has a rectangular shape.

20           9.    The lead electrode assembly of claim 4, wherein an  
inner side of the strip of material is coupled to the electrode.

25           10.   The lead electrode assembly of claim 9, wherein the  
lead electrode assembly further comprises a molded cover,  
wherein the molded cover is coupled between the inner side of  
the strip of material and the electrode.

11.   The lead electrode assembly of claim 9, wherein the  
electrode is substantially planar comprising a first side, a  
second side, a top surface and a bottom surface.

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12. The lead electrode assembly of claim 11, wherein the inner side of the strip of material is coupled to the top surface and the bottom surface of the electrode.

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13. The lead electrode assembly of claim 11, wherein the inner side of the strip of material comprising the first channel guide is coupled to the top surface and the bottom surface of the electrode on the first side of the electrode.

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14. The lead electrode assembly of claim 13, wherein the lead electrode assembly further comprises a backing layer, wherein the backing layer is coupled between the top surface of the first side of the electrode and the inner side of the strip of material comprising the first channel guide.

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15. The lead electrode assembly of claim 14, wherein the inner side of the strip of material comprising the second channel guide is coupled to the top surface and bottom surface of the electrode on the second side of the electrode.

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16. The lead electrode assembly of claim 15, wherein the backing layer is coupled between the top surface of the second

5 side of the electrode and the inner side of the strip of  
material comprising the second channel guide.

17. The lead electrode assembly of claim 4, wherein the  
lead electrode assembly further comprises a molded cover,  
10 wherein the molded cover is coupled to the electrode.

18. The lead electrode assembly of claim 17, wherein the  
strip of material is attached to the molded cover.

19. The lead electrode assembly of claim 18, wherein the  
molded cover forms a skirt around the electrode.

20. The lead electrode assembly of claim 17, wherein the  
molded cover is composed of a polymeric material.

21. The lead electrode assembly of claim 20, wherein the  
polymeric material is selected from the group consisting  
essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
25 polytetrafluoroethylene (PTFE), a silicone, and mixtures  
thereof.

5           22. The lead electrode assembly of claim 3, wherein the  
lead electrode assembly further comprises a molded cover,  
wherein the molded cover is coupled to the electrode.

          23. The lead electrode assembly of claim 22, wherein the  
10 molded cover partially covers the electrode.

          24. The lead electrode assembly of claim 23, wherein the  
molded cover forms a skirt around the electrode.

15           25. The lead electrode assembly of claim 22, wherein the  
molded cover is composed of a polymeric material.

20           26. The lead electrode assembly of claim 25, wherein the  
polymeric material is selected from the group consisting  
essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
thereof.

25           27. The lead electrode assembly of claim 22, wherein the  
first channel guide and the second channel guide are formed as  
part of the molded cover.

5           28. The lead electrode assembly of claim 1, wherein the  
electrode comprises a mesh of metallic material.

29. The lead electrode assembly of claim 28, wherein the  
metallic material is selected from the group consisting  
10 essentially of titanium, nickel alloys, stainless steel alloys,  
platinum, platinum iridium, and mixtures thereof.

30. The lead electrode assembly of claim 1, wherein the  
electrode comprises a substantially flat sheet of metallic  
15 material.

31. The lead electrode assembly of claim 30, wherein the  
metallic material is selected from the group consisting  
essentially of titanium, nickel alloys, stainless steel alloys,  
20 platinum, platinum iridium, and mixtures thereof.

32. The lead electrode assembly of claim 1, wherein the  
electrode comprises at least one surface.

25           33. The lead electrode assembly of claim 32, wherein the  
electrode is substantially planar.

5           34. The lead electrode assembly of claim 32, wherein the  
said at least one surface has a surface area between  
approximately 100 square millimeters and approximately 2000  
square millimeters.

10           35. The lead electrode assembly of claim 1, wherein the  
lead electrode assembly further comprises a lead, wherein the  
lead is coupled to the electrode.

15           36. The lead electrode assembly of claim 35, wherein the  
lead comprises one or more electrical conductors and an  
electrically insulating sheath, wherein the electrically  
insulating sheath encloses said one or more electrical  
conductors.

20           37. The lead electrode assembly of claim 35, wherein the  
said one or more electrical conductors are electrically coupled  
to the electrode.

25           38. The lead electrode assembly of claim 35, wherein the  
lead electrode assembly further comprises a connector, wherein  
the lead comprises a proximal end and a distal end and wherein  
the connector is physically connected to the distal end of the  
lead.

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39. The lead electrode assembly of claim 38, wherein the connector is electrically coupled to the electrode.

40. The lead electrode assembly of claim 35, the lead is  
10 between approximately 5 cm and approximately 52 cm in length.

41. The lead electrode assembly of claim 40, wherein the lead is between approximately 5 cm and approximately 30 cm in length.

42. The lead electrode assembly of claim 41, wherein the lead is between approximately 10 cm and approximately 20 cm in length.

43. The lead electrode assembly of claim 40, wherein the lead length is one of a plurality of pre-set lengths.

44. The lead electrode assembly of claim 43, wherein the pre-set lengths vary by approximately 10 cm.

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45. The lead electrode assembly of claim 35, wherein the lead has a proximal end and a distal end and further wherein the



5 proximal end of the lead is physically connected to the  
electrode.

46. The lead electrode assembly of claim 45, wherein the  
lead electrode assembly further comprises a lead fastener  
10 coupled between the lead and the electrode.

47. A lead electrode assembly for use with an implantable  
cardioverter-defibrillator subcutaneously implanted outside the  
ribcage between the third and twelfth ribs comprising:

an electrode;

a first channel guide and a second channel guide  
coupled to the electrode for positioning the lead  
electrode assembly.

48. The lead electrode assembly of claim 47, wherein the  
electrode is substantially planar.

49. The lead electrode assembly of claim 48, wherein the  
at least two channel guides comprise a first channel guide and a  
25 second channel guide and wherein the first channel guide is  
coupled to a first side of the electrode and the second channel  
guide is coupled to a second side of the electrode.

5           50. The lead electrode assembly of claim 49, wherein the  
first channel guide and the second channel guide each comprise a  
strip of material.

10           51. The lead electrode assembly of claim 50, wherein the  
strip of material comprises a polymeric material.

15           52. The lead electrode assembly of claim 51, wherein the  
polymeric material is selected from the group consisting  
essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
thereof.

20           53. The lead electrode assembly of claim 50, wherein the  
strip of material is coupled to the electrode with stitching.

          54. The lead electrode assembly of claim 50, wherein the  
strip of material has a rectangular shape.

25           55. The lead electrode assembly of claim 50, wherein an  
inner side of the strip of material is coupled to the electrode.

5           56. The lead electrode assembly of claim 55, wherein the  
lead electrode assembly further comprises a molded cover,  
wherein the molded cover is coupled between the inner side of  
the strip of material and the electrode.

10          57. The lead electrode assembly of claim 55, wherein the  
electrode is substantially planar comprising a first side, a  
second side, a top surface and a bottom surface.

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5           61. The lead electrode assembly of claim 60, wherein the  
inner side of the strip of material comprising the second  
channel guide is coupled to the top surface and bottom surface  
of the electrode on the second side of the electrode.

10           62. The lead electrode assembly of claim 61, wherein the  
backing layer is coupled between the top surface of the second  
side of the electrode and the inner side of the strip of  
material comprising the second channel guide.

15           63. The lead electrode assembly of claim 50, wherein the  
lead electrode assembly further comprises a molded cover,  
wherein the molded cover is coupled to the electrode.

20           64. The lead electrode assembly of claim 63, wherein the  
strip of material is attached to the molded cover.

          65. The lead electrode assembly of claim 64, wherein the  
molded cover forms a skirt around the electrode.

25           66. The lead electrode assembly of claim 63, wherein the  
molded cover is composed of a polymeric material.

5           67. The lead electrode assembly of claim 66, wherein the  
polymeric material is selected from the group consisting  
essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
10 thereof.

68. The lead electrode assembly of claim 49, wherein the  
lead electrode assembly further comprises a molded cover,  
wherein the molded cover is coupled to the electrode.

69. The lead electrode assembly of claim 68, wherein the  
molded cover partially covers the electrode.

70. The lead electrode assembly of claim 69, wherein the  
molded cover forms a skirt around the electrode.

71. The lead electrode assembly of claim 68, wherein the  
molded cover is composed of a polymeric material.

25           72. The lead electrode assembly of claim 71, wherein the  
polymeric material is selected from the group consisting  
essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a

5 polytetrafluoroethylene (PTFE), a silicone, and mixtures thereof.

73. The lead electrode assembly of claim 68, wherein the first channel guide and the second channel guide are formed as  
10 part of the molded cover.

74. The lead electrode assembly of claim 47, wherein the electrode comprises a mesh of metallic material.

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75. The lead electrode assembly of claim 74, wherein the metallic material is selected from the group consisting essentially of titanium, nickel alloys, stainless steel alloys, platinum, platinum iridium, and mixtures thereof.

2076. The lead electrode assembly of claim 47, wherein the electrode comprises a substantially flat sheet of metallic material.

77. The lead electrode assembly of claim 76, wherein the  
25 metallic material is selected from the group consisting essentially of titanium, nickel alloys, stainless steel alloys, platinum, platinum iridium, and mixtures thereof.

5        78. The lead electrode assembly of claim 47, wherein the  
electrode comprises at least one surface.

79. The lead electrode assembly of claim 78, wherein the  
electrode is substantially planar.

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80. The lead electrode assembly of claim 78, wherein the  
said at least one surface has a surface area between  
approximately 100 square millimeters and approximately 2000  
square millimeters.

81. The lead electrode assembly of claim 47, wherein the  
lead electrode assembly further comprises a lead, wherein the  
lead is coupled to the electrode.

82. The lead electrode assembly of claim 81, wherein the  
lead comprises one or more electrical conductors and an  
electrically insulating sheath, wherein the electrically  
insulating sheath encloses said one or more electrical  
conductors.

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83. The lead electrode assembly of claim 81, wherein the  
said one or more electrical conductors are electrically coupled  
to the electrode.

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84. The lead electrode assembly of claim 81, wherein the lead electrode assembly further comprises a connector, wherein the lead comprises a proximal end and a distal end and wherein the connector is physically connected to the distal end of the  
10 lead.

85. The lead electrode assembly of claim 84, wherein the connector is electrically coupled to the electrode.

86. The lead electrode assembly of claim 81, the lead is  
15 between approximately 5 cm and approximately 52 cm in length.

87. The lead electrode assembly of claim 86, wherein the lead is between approximately 5 cm and approximately 30 cm in  
20 length.

88. The lead electrode assembly of claim 87, wherein the lead is between approximately 10 cm and approximately 20 cm in  
length.

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89. The lead electrode assembly of claim 86, wherein the lead length is one of a plurality of pre-set lengths.



5           90. The lead electrode assembly of claim 89, wherein the  
pre-set lengths vary by approximately 10 cm.

          91. The lead electrode assembly of claim 81, wherein the  
lead has a proximal end and a distal end and further wherein the  
10 proximal end of the lead is physically connected to the  
electrode.

          92. The lead electrode assembly of claim 91, wherein the  
lead electrode assembly further comprises a lead fastener  
coupled between the lead and the electrode.

          93. A lead electrode assembly for subcutaneous  
implantation in a patient's posterior thorax from an incision in  
the skin covering the patient's anterior thorax comprising:

20           an electrode;  
          a first channel guide and a second channel guide  
coupled to the electrode for positioning the lead  
electrode assembly.

25           94. The lead electrode assembly of claim 93, wherein the  
electrode is substantially planar.

5           95. The lead electrode assembly of claim 94, wherein the  
at least two channel guides comprise a first channel guide and a  
second channel guide and wherein the first channel guide is  
coupled to a first side of the electrode and the second channel  
guide is coupled to a second side of the electrode.

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96. The lead electrode assembly of claim 95, wherein the  
first channel guide and the second channel guide each comprise a  
strip of material.

15           97. The lead electrode assembly of claim 96, wherein the  
strip of material comprises a polymeric material.

20           98. The lead electrode assembly of claim 97, wherein the  
polymeric material is selected from the group consisting  
essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
thereof.

25           99. The lead electrode assembly of claim 96, wherein the  
strip of material is coupled to the electrode with stitching.

5           100. The lead electrode assembly of claim 96, wherein the  
strip of material has a rectangular shape.

101. The lead electrode assembly of claim 96, wherein an  
inner side of the strip of material is coupled to the electrode.

10

102. The lead electrode assembly of claim 101, wherein the  
lead electrode assembly further comprises a molded cover,  
wherein the molded cover is coupled between the inner side of  
the strip of material and the electrode.

103. The lead electrode assembly of claim 101, wherein the  
electrode is substantially planar comprising a first side, a  
second side, a top surface and a bottom surface.

104. The lead electrode assembly of claim 103, wherein the  
inner side of the strip of material is coupled to the top  
surface and the bottom surface of the electrode.

105. The lead electrode assembly of claim 103, wherein the  
inner side of the strip of material comprising the first channel  
guide is coupled to the top surface and the bottom surface of  
the electrode on the first side of the electrode.

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5           106. The lead electrode assembly of claim 105, wherein the  
lead electrode assembly further comprises a backing layer,  
wherein the backing layer is coupled between the top surface of  
the first side of the electrode and the inner side of the strip  
of material comprising the first channel guide.

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107. The lead electrode assembly of claim 106, wherein the  
inner side of the strip of material comprising the second  
channel guide is coupled to the top surface and bottom surface  
of the electrode on the second side of the electrode.

108. The lead electrode assembly of claim 107, wherein the  
backing layer is coupled between the top surface of the second  
side of the electrode and the inner side of the strip of  
material comprising the second channel guide.

109. The lead electrode assembly of claim 96, wherein the  
lead electrode assembly further comprises a molded cover,  
wherein the molded cover is coupled to the electrode.

25           110. The lead electrode assembly of claim 109, wherein the  
strip of material is attached to the molded cover.

5           111. The lead electrode assembly of claim 110, wherein the  
molded cover forms a skirt around the electrode.

112. The lead electrode assembly of claim 109, wherein the  
molded cover is composed of a polymeric material.

10

113. The lead electrode assembly of claim 112, wherein the  
polymeric material is selected from the group consisting  
essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
thereof.

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114. The lead electrode assembly of claim 95, wherein the  
lead electrode assembly further comprises a molded cover,  
wherein the molded cover is coupled to the electrode.

115. The lead electrode assembly of claim 114, wherein the  
molded cover partially covers the electrode.

25           116. The lead electrode assembly of claim 115, wherein the  
molded cover forms a skirt around the electrode.

5           117. The lead electrode assembly of claim 114, wherein the  
molded cover is composed of a polymeric material.

118. The lead electrode assembly of claim 117, wherein the  
polymeric material is selected from the group consisting  
10 essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
thereof.

119. The lead electrode assembly of claim 114, wherein the  
first channel guide and the second channel guide are formed as  
part of the molded cover.

120. The lead electrode assembly of claim 93, wherein the  
20 electrode comprises a mesh of metallic material.

121. The lead electrode assembly of claim 120, wherein the  
metallic material is selected from the group consisting  
essentially of titanium, nickel alloys, stainless steel alloys,  
25 platinum, platinum iridium, and mixtures thereof.

5           122. The lead electrode assembly of claim 93, wherein the  
electrode comprises a substantially flat sheet of metallic  
material.

10           123. The lead electrode assembly of claim 122, wherein the  
metallic material is selected from the group consisting  
essentially of titanium, nickel alloys, stainless steel alloys,  
platinum, platinum iridium, and mixtures thereof.

15           124. The lead electrode assembly of claim 93, wherein the  
electrode comprises at least one surface.

20           125. The lead electrode assembly of claim 124, wherein the  
electrode is substantially planar.

25           126. The lead electrode assembly of claim 124, wherein the  
said at least one surface has a surface area between  
approximately 100 square millimeters and approximately 2000  
square millimeters.

30           127. The lead electrode assembly of claim 93, wherein the  
lead electrode assembly further comprises a lead, wherein the  
lead is coupled to the electrode.

5        128. The lead electrode assembly of claim 127, wherein the  
lead comprises one or more electrical conductors and an  
electrically insulating sheath, wherein the electrically  
insulating sheath encloses said one or more electrical  
conductors.

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129. The lead electrode assembly of claim 127, wherein the  
said one or more electrical conductors are electrically coupled  
to the electrode.

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5           133. The lead electrode assembly of claim 132, wherein the  
lead is between approximately 5 cm and approximately 30 cm in  
length.

10           134. The lead electrode assembly of claim 133, wherein the  
lead is between approximately 10 cm and approximately 20 cm in  
length.

135. The lead electrode assembly of claim 132, wherein the  
lead length is one of a plurality of pre-set lengths.

136. The lead electrode assembly of claim 135, wherein the  
pre-set lengths vary by approximately 10 cm.

137. The lead electrode assembly of claim 127, wherein the  
lead has a proximal end and a distal end and further wherein the  
proximal end of the lead is physically connected to the  
electrode.

138. The lead electrode assembly of claim 137, wherein the  
25 lead electrode assembly further comprises a lead fastener  
coupled between the lead and the electrode.

5           139. An       implantable       cardioverter-defibrillator       for  
subcutaneous positioning between the third rib and the twelfth  
rib within a patient, the implantable cardioverter-defibrillator  
comprising:

          a housing; and

10           a lead electrode assembly coupled to the housing,  
          wherein the lead electrode assembly comprises:

          an electrode;

          a first channel guide and a second channel guide  
          coupled to the electrode for positioning the lead  
          electrode assembly.

15           140. The implantable cardioverter-defibrillator of claim  
139, wherein the electrode is substantially planar.

20           141. The implantable cardioverter-defibrillator of claim  
140, wherein the at least two channel guides comprise a first  
channel guide and a second channel guide and wherein the first  
channel guide is coupled to a first side of the electrode and  
the second channel guide is coupled to a second side of the  
25 electrode.

5        142. The implantable cardioverter-defibrillator of claim  
141, wherein the first channel guide and the second channel  
guide each comprise a strip of material.

10       143. The implantable cardioverter-defibrillator of claim  
142, wherein the strip of material comprises a polymeric  
material.

15       144. The implantable cardioverter-defibrillator of claim  
143, wherein the polymeric material is selected from the group  
consisting essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
thereof.

20       145. The implantable cardioverter-defibrillator of claim  
142, wherein the strip of material is coupled to the electrode  
with stitching.

25       146. The implantable cardioverter-defibrillator of claim  
142, wherein the strip of material has a rectangular shape.

5           147. The implantable cardioverter-defibrillator of claim  
142, wherein an inner side of the strip of material is coupled  
to the electrode.

10           148. The implantable cardioverter-defibrillator of claim  
147, wherein the lead electrode assembly further comprises a  
molded cover, wherein the molded cover is coupled between the  
inner side of the strip of material and the electrode.

15           149. The implantable cardioverter-defibrillator of claim  
147, wherein the electrode is substantially planar comprising a  
first side, a second side, a top surface and a bottom surface.

20           150. The implantable cardioverter-defibrillator of claim  
149, wherein the inner side of the strip of material is coupled  
to the top surface and the bottom surface of the electrode.

25           151. The implantable cardioverter-defibrillator of claim  
149, wherein the inner side of the strip of material comprising  
the first channel guide is coupled to the top surface and the  
bottom surface of the electrode on the first side of the  
electrode.

5        152. The implantable cardioverter-defibrillator of claim  
151, wherein the lead electrode assembly further comprises a  
backing layer, wherein the backing layer is coupled between the  
top surface of the first side of the electrode and the inner  
side of the strip of material comprising the first channel  
10 guide.

153. The implantable cardioverter-defibrillator of claim  
152, wherein the inner side of the strip of material comprising  
the second channel guide is coupled to the top surface and  
bottom surface of the electrode on the second side of the  
electrode.

154. The implantable cardioverter-defibrillator of claim  
153, wherein the backing layer is coupled between the top  
surface of the second side of the electrode and the inner side  
of the strip of material comprising the second channel guide.

155. The implantable cardioverter-defibrillator of claim  
142, wherein the lead electrode assembly further comprises a  
25 molded cover, wherein the molded cover is coupled to the  
electrode.

5        156. The implantable cardioverter-defibrillator of claim  
155, wherein the strip of material is attached to the molded  
cover.

157. The implantable cardioverter-defibrillator of claim  
10 156, wherein the molded cover forms a skirt around the  
electrode.

158. The implantable cardioverter-defibrillator of claim  
155, wherein the molded cover is composed of a polymeric  
material.

159. The implantable cardioverter-defibrillator of claim  
158, wherein the polymeric material is selected from the group  
consisting essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
thereof.

160. The implantable cardioverter-defibrillator of claim  
25 141, wherein the lead electrode assembly further comprises a  
molded cover, wherein the molded cover is coupled to the  
electrode.

5           161. The implantable cardioverter-defibrillator of claim  
160, wherein the molded cover partially covers the electrode.

          162. The implantable cardioverter-defibrillator of claim  
161, wherein the molded cover forms a skirt around the  
10 electrode.

          163. The implantable cardioverter-defibrillator of claim  
160, wherein the molded cover is composed of a polymeric  
material.

          164. The implantable cardioverter-defibrillator of claim  
163, wherein the polymeric material is selected from the group  
consisting essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
20 polytetrafluoroethylene (PTFE), a silicone, and mixtures  
thereof.

          165. The implantable cardioverter-defibrillator of claim  
160, wherein the first channel guide and the second channel  
25 guide are formed as part of the molded cover.

5           166. The implantable cardioverter-defibrillator of claim  
139, wherein the electrode comprises a mesh of metallic  
material.

10           167. The implantable cardioverter-defibrillator of claim  
166, wherein the metallic material is selected from the group  
consisting essentially of titanium, nickel alloys, stainless  
steel alloys, platinum, platinum iridium, and mixtures thereof.

15           168. The implantable cardioverter-defibrillator of claim  
139, wherein the electrode comprises a substantially flat sheet  
of metallic material.

20           169. The implantable cardioverter-defibrillator of claim  
168, wherein the metallic material is selected from the group  
consisting essentially of titanium, nickel alloys, stainless  
steel alloys, platinum, platinum iridium, and mixtures thereof.

25           170. The implantable cardioverter-defibrillator of claim  
139, wherein the electrode comprises at least one surface.

          171. The implantable cardioverter-defibrillator of claim  
170, wherein the electrode is substantially planar.



5        172. The implantable cardioverter-defibrillator of claim  
170, wherein the said at least one surface has a surface area  
between approximately 100 square millimeters and approximately  
2000 square millimeters.

10       173. The implantable cardioverter-defibrillator of claim  
139, wherein the lead electrode assembly further comprises a  
lead, wherein the lead is coupled between the electrode and the  
housing.

15       174. The implantable cardioverter-defibrillator of claim  
173, wherein the lead comprises one or more electrical  
conductors and an electrically insulating sheath, wherein the  
electrically insulating sheath encloses said one or more  
electrical conductors.

20       175. The implantable cardioverter-defibrillator of claim  
173, wherein the said one or more electrical conductors are  
electrically coupled to the electrode.

25       176. The implantable cardioverter-defibrillator of claim  
173, wherein the lead electrode assembly further comprises a  
connector, wherein the lead comprises a proximal end and a

5 distal end and wherein the connector is physically connected to  
the distal end of the lead.

177. The implantable cardioverter-defibrillator of claim  
176, wherein the connector is electrically coupled to the  
10 electrode.

178. The implantable cardioverter-defibrillator of claim  
173, the lead is between approximately 5 cm and approximately 52  
cm in length.

179. The implantable cardioverter-defibrillator of claim  
178, wherein the lead is between approximately 5 cm and  
approximately 30 cm in length.

180. The implantable cardioverter-defibrillator of claim  
179, wherein the lead is between approximately 10 cm and  
approximately 20 cm in length.

181. The implantable cardioverter-defibrillator of claim  
25 180, wherein the lead length is one of a plurality of pre-set  
lengths.

5        182. The implantable cardioverter-defibrillator of claim  
181, wherein the pre-set lengths vary by approximately 10 cm.

183. The implantable cardioverter-defibrillator of claim  
173, wherein the lead has a proximal end and a distal end and  
10 further wherein the proximal end of the lead is physically  
connected to the electrode.

184. The implantable cardioverter-defibrillator of claim  
183, wherein the lead electrode assembly further comprises a  
lead fastener coupled between the lead and the electrode.

185. A lead electrode assembly manipulation tool  
comprising:

a rod; and

a pair of tines for capturing a lead electrode  
assembly having a first channel guide and a second  
channel guide, wherein the pair of tines is coupled to  
the rod.

25        186. The lead electrode assembly manipulation tool of claim  
185, wherein each of the pair of tines is substantially parallel  
to the other.

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5        187. The lead electrode assembly manipulation tool of claim  
185, wherein each of the pair of tines is separated from the  
other by a gap.

188. The lead electrode assembly manipulation tool of claim  
10 185, wherein the pair of tines is substantially straight.

189. The lead electrode assembly manipulation tool of claim  
185, wherein the lead electrode assembly manipulation tool  
further comprises a tine base, wherein the tine base is  
connected to the rod and further wherein the tine base is  
connected to the pair of tines.

190. The lead electrode assembly manipulation tool of claim  
189, wherein each of the pair of tines comprises a proximal end  
and a distal end and further wherein the proximal ends of the  
pair of tines are attached to the tine base.

191. The lead electrode assembly manipulation tool of claim  
190, wherein the distal end of each of the pair of tines is  
25 rounded.

5           192. The lead electrode assembly manipulation tool of claim  
189, wherein the rod has a proximal end and a distal end and  
wherein the distal end of the rod is connected to the tine base.

10           193. The lead electrode assembly manipulation tool of claim  
192, wherein the lead electrode assembly manipulation tool  
further comprises a handle, wherein the handle is coupled to the  
proximal end of the rod.

15           194. The lead electrode assembly manipulation tool of claim  
185, wherein the rod is curved.

20           195. The lead electrode assembly manipulation tool of claim  
185, wherein the pair of tines is composed a metallic material.

25           196. The lead electrode assembly of claim 195, wherein the  
metallic material is selected from the group consisting  
essentially of titanium, nickel alloys, stainless steel alloys,  
platinum, platinum iridium, and mixtures thereof.

30           197. The lead electrode assembly manipulation tool of claim  
185, wherein the pair of tines is composed of a polymeric  
material.

5 198. The lead electrode assembly of claim 197, wherein the  
polymeric material is selected from the group consisting  
essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
10 thereof.

199. The lead electrode assembly manipulation tool of claim  
185, wherein the rod is composed a metallic material.

200. The lead electrode assembly of claim 199, wherein the  
metallic material is selected from the group consisting  
essentially of titanium, nickel alloys, stainless steel alloys,  
platinum, platinum iridium, and mixtures thereof.

201. The lead electrode assembly manipulation tool of claim  
185, wherein the rod is composed of a polymeric material.

202. The lead electrode assembly of claim 201, wherein the  
polymeric material is selected from the group consisting  
25 essentially of a polyurethane, a polyamide, a  
polyetheretherketone (PEEK), a polyether block amide (PEBA), a  
polytetrafluoroethylene (PTFE), a silicone, and mixtures  
thereof.

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203. A method for surgically implanting a lead electrode assembly subcutaneously outside a patient's ribcage, the method comprising the steps of:

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providing a lead electrode assembly having a first  
channel guide and a second channel guide;  
providing a lead electrode assembly manipulation tool;  
creating a subcutaneous path outside the ribcage;  
capturing the lead electrode assembly with the lead  
electrode assembly manipulation tool;  
moving the lead electrode assembly through the path;  
and  
releasing the lead electrode assembly from the lead  
electrode assembly manipulation tool.

20

204. The method of claim 203, wherein the step of creating a subcutaneous path outside the ribcage further comprises the steps of:

25

providing a hemostat;  
creating an incision in the thoracic region of the  
patient; and  
creating the subcutaneous path by moving the hemostat  
between the ribcage and the skin.

205. The method of claim 204, wherein the step of creating the subcutaneous path by moving the hemostat between the ribcage and the skin further comprises the step of:

moving the hemostat laterally and posteriorly around the side of the patient until the subcutaneous path terminates at a termination point such that if a straight line were drawn from the incision to the termination point, the line would intersect the heart of the patient.

206. The method of claim 204, wherein the step of creating the subcutaneous path by moving the hemostat between the ribcage and the skin further comprises the step of:

moving the hemostat laterally and posteriorly around the side of the patient until the subcutaneous path terminates at a termination point within 10 cm of the spine of the patient between the third and twelfth rib.

207. The method of claim 204, wherein the incision in the thoracic region of the patient is in the anterior of the thorax.

208. The method of claim 204, wherein the lead electrode assembly manipulation tool comprises a rod and a pair of tines.



5

209. The method of claim 208, wherein the step of capturing the lead electrode assembly with the lead electrode assembly manipulation tool further comprises the step of:

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sliding one of the pair of tines of the lead electrode assembly manipulation tool into each of the first channel guide and second channel guide of the lead electrode assembly.

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210. The method of claim 208, wherein the step of capturing the lead electrode assembly with the lead electrode assembly manipulation tool further comprises the step of:

holding the lead of the lead electrode assembly still relative to the rod of the lead electrode assembly manipulation tool.

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211. The method of claim 208, wherein the step of capturing the lead electrode assembly with the lead electrode assembly manipulation tool further comprises the step of:

25

holding the lead of the lead electrode assembly against the rod of the lead electrode assembly manipulation tool.

5           212. The method of claim 208, wherein the step of releasing  
the lead electrode assembly from the lead electrode assembly  
manipulation tool further comprises the step of:

allowing the lead of the lead electrode assembly to  
move relative to the rod of the lead electrode  
10           assembly manipulation tool.

213. A subcutaneous implantable cardioverter-defibrillator  
kit for use in surgically implanting a subcutaneous implantable  
cardioverter-defibrillator and a lead electrode assembly within  
a patient comprising:

a tray; and

a lead electrode assembly having a first channel guide  
and a second channel guide stored in the tray.

20           214. The subcutaneous implantable cardioverter-  
defibrillator kit of claim 213, further comprising a lead  
electrode assembly manipulation tool having a pair of tines,  
wherein the lead electrode assembly manipulation tool is stored  
in the tray.

25           215. The subcutaneous implantable cardioverter-  
defibrillator kit of claim 213, further comprising a  
subcutaneous implantable cardioverter-defibrillator, wherein the

5 subcutaneous implantable cardioverter-defibrillator is stored in  
the tray.

216. The subcutaneous implantable cardioverter-defibrillator kit of claim 213, further comprising a medical  
10 adhesive, wherein the medical adhesive is stored in the tray.

217. The subcutaneous implantable cardioverter-defibrillator kit of claim 213, further comprising an anesthetic, wherein the anesthetic is stored in the tray.

218. The subcutaneous implantable cardioverter-defibrillator kit of claim 213, further comprising a tube of mineral oil, wherein the tube of mineral oil is stored in the tray.